

Response dated 04/29/2005
Response to Office Action mailed 07/02/2004

Application No. 10/044,405

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of claims:

1. (Currently Amended) A neural-stimulation method comprising:
providing neural stimulation having a plurality of stimulation parameters including a stimulation amplitude, a stimulation frequency, a stimulation pulse duration, an electrode-firing pattern, and a set of one or more electrode-polarity-firing conditions;
pseudo-randomly varying at least a first of the stimulation parameters; and
changing a value of a second of the stimulation parameters based upon having pseudo-randomly varied the first stimulation parameter and based upon a pre determined relationship that specifies how changes in the first parameter affect desirable values for the second parameter.
2. (Original) The neural-stimulation method of claim 1, wherein the pre determined relationship is substantially similar to a strength-duration curve for neural excitation.
3. (Original) The neural-stimulation method of claim 2, further comprising:
measuring the strength-duration curve for neural excitation for at least one of a patient's neurons.
4. (Original) The neural-stimulation method of claim 3, wherein measuring the strength-duration curve for neural excitation for the patient's neurons comprises:
measuring a plurality of stimulation-amplitude values at a corresponding plurality of stimulation-pulse durations and observing whether a desired clinical outcome is achieved.
5. (Currently Amended) A neural-stimulation method comprising:
measuring a strength-duration curve for neural excitation for at least one of a patient's neurons, the measuring of the strength-duration curve including measuring a plurality of stimulation-amplitude values at a corresponding plurality of stimulation-pulse durations and observing whether a desired clinical outcome is achieved, the desired clinical outcome including the reduction of tremor via thalamic stimulation;

Response dated 04/29/2005
Response to Office Action mailed 07/02/2004

Application No. 10/044,405

providing neural stimulation having a plurality of stimulation parameters including a stimulation amplitude, a stimulation frequency, a stimulation pulse duration, an electrode-firing pattern, and a set of one or more electrode-polarity-firing conditions; pseudo-randomly varying at least a first of the stimulation parameters; and changing a value of a second of the stimulation parameters based upon having pseudo-randomly varied the first stimulation parameter and based upon a predetermined relationship that specifies how changes in the first parameter affect desirable values for the second parameter, the predetermined relationship substantially similar to the strength-duration curve for neural excitation.

6. (Currently Amended) The neural-stimulation method of claim 1, further comprising:

varying the first stimulation parameter to produce a neuron-firing pattern, the producing a neuron-firing pattern having a plurality of different interspike intervals measured either over an interspike-measurement duration or over a plurality of spikes.

7. (Currently Amended) The neural-stimulation method of claim 6, wherein ~~varying the first stimulation parameter to produce a~~ the neuron-firing pattern having a plurality of different interspike intervals comprises:

~~varying the first stimulation parameter to produce a plurality of neuron firing patterns~~ is selected from the group consisting of: a substantially-normal-distribution neural-firing pattern, a skew-left-distribution neural-firing pattern, a skew-right-distribution neural-firing pattern, and a bimodal-bursting-distribution neural-firing pattern.

8. (Original) The neural-stimulation method of claim 1, wherein at least one of the one or more electrode-polarity-firing conditions is selected from the group consisting of: anode, cathode, and off.

9. (Original) The neural-stimulation method of claim 1, wherein pseudo-randomly varying or changing the set of one or more electrode-polarity-firing conditions changes a spatial pattern of neurons affected by the neural stimulation.

Response dated 04/29/2005
Response to Office Action mailed 07/02/2004

Application No. 10/044,405

10. (Currently Amended) A deep brain neural-stimulation method comprising:
providing deep brain neural stimulation having a plurality of stimulation parameters including a stimulation amplitude, a stimulation frequency, a stimulation pulse duration, an electrode-firing pattern, and a set of one or more electrode-polarity-firing conditions;

pseudo-randomly varying at least a first of the stimulation parameters; and

changing a value of a second of the stimulation parameters based upon having pseudo-randomly varied the first stimulation parameter and based upon a pre-determined relationship that specifies how changes in the first parameter affect desirable values for the second parameter.

11. (Currently Amended) The deep brain neural-stimulation method of claim 10 in which the step of varying at least a first of the stimulation parameters includes pseudorandomly varying at least a first of the stimulation parameters within a predetermined range of values.

12. (Currently Amended) The deep brain neural-stimulation method of claim 10 in which the step of varying at least a first of the stimulation parameters includes varying at least a first of the stimulation parameters sufficiently to avoid development of physiological tolerance to the neural-stimulation.

13. (Currently Amended) A neural-stimulation device comprising:

means for providing neural stimulation having a plurality of stimulation parameters including a stimulation amplitude, a stimulation frequency, a stimulation pulse duration, an electrode-firing pattern, and a set of one or more electrode-polarity-firing conditions;

means for pseudo-randomly varying at least a first of the stimulation parameters;

and

means for changing a value of a second of the stimulation parameters based upon having pseudo-randomly varied the first stimulation parameter and based upon a predetermined relationship that specifies how changes in the first parameter affect desirable values for the second parameter.

14. (Canceled).

Response dated 04/29/2005
Response to Office Action mailed 07/02/2004

Application No. 10/044,405

specifies how changes in the first parameter affect desirable values for the second parameter.

19. (Original) The neural-stimulation system of claim 18 in which the neural-stimulation device pseudo-randomly varies at least the first of the stimulation parameters.

20. (Original) The neural-stimulation system of claim 19 in which the neural-stimulation device pseudo-randomly varies at least the first of the stimulation parameters within a predetermined range.

21. (Original) A computer-readable medium having computer executable instructions for causing a neural-stimulation device to perform the steps recited in claim 10.

22. (Original) A computer-readable medium having computer executable instructions for causing a neural-stimulation device to perform the steps recited in claim 11.

23. (Original) A computer-readable medium having computer executable instructions for causing a neural-stimulation device to perform the steps recited in claim 12.